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EVALUATION OF CLINICAL, HAEMATOLOGICAL AND BIOCHEMICAL PARAMETERS IN INDOOR DENGUE PATIENTS, AHMEDABAD, CIVIL HOSPITAL

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Abstract : Dengue fever, a mosquito-borne viral disease caused by the dengue virus, remains a significant global health concern, particularly in tropical and subtropical areas. The World Health Organization (WHO) estimates approximately 390 million dengue infections annually worldwide, a considerable number of which progress to more severe forms such as dengue hemorrhagic fever (DHF) and dengue shock syndrome (DSS). The clinical manifestations of dengue infection range from mild flu-like symptoms to severe, potentially life-threatening conditions. High fever, severe headache, pain behind the eyes, muscle and joint pain, and rash are among the commonly reported symptoms.

Key words: Mosquito-borne viral disease, hemorrhagic fever, dengue shock syndrome, dengue-induced thrombocytopenia

1. INTRODUCTION

Dengue fever, a mosquito-borne viral disease caused by the dengue virus, remains a significant global health concern, particularly in tropical and subtropical areas. The World Health Organization (WHO) estimates approximately 390 million dengue infections annually worldwide, a considerable number of which progress to more severe forms such as dengue hemorrhagic fever (DHF) and dengue shock syndrome (DSS)(Bhatt *et al*.,2013). The clinical manifestations of dengue infection range from mild flu-like symptoms to severe, potentially life-threatening conditions. High fever, severe headache, pain behind the eyes, muscle and joint pain, and rash are among the commonly reported symptoms (Guzman and Harris,2015; Simmons *et al*,2012).

Moreover, the infection is marked by notable hematological abnormalities like thrombocytopenia and leucopenia, which are crucial for its diagnosis and prognosis (Trung, *et al*, 2010; Malavige, *et al*., 2004)). Biochemical parameters, including alterations in liver enzymes and serum proteins, further complicate the clinical landscape, indicating the severity of the infection (Lee, *et al*., 2005; Wichmann, et al.,2004).

Early and precise diagnosis is paramount for effective patient management and reducing healthcare system burdens. Although NS1 antigen tests, along with IgM and IgG serological tests, are routinely employed for diagnosis, their interpretation demands a thorough understanding of both clinical and laboratory parameters. This complexity underscores the necessity for studies aimed at dissecting the nuanced interplay of hematological, biochemical, and clinical indicators in dengue patients, particularly those admitted to tertiary care facilities (Halstead, 2008; Martina *et al.*,2009).Management strategies for dengue primarily revolve around supportive care, emphasizing the critical role of fluid management and the vigilant monitoring of hematological and biochemical markers (Whitehorn and Simmons, 2011; Gubler, 1998). The severe spectrum of the disease often necessitates intensive care, highlighting the pivotal role of tertiary care hospitals in handling such cases (Rigau-Pérez, *et al.* 1998; Kularatne, 2015). In the present study retrospective analysis was made for **clinical, haematological and biochemical parameters in indoor dengue patients, Ahmedabad Civil hospital.**

2. NEED OF THE STUDY

This study seeks to delineate the clinical presentations, biochemical and hematological profiles of Dengue across a diverse patient cohort, aiming to uncover patterns that may enhance diagnostic accuracy, inform treatment strategies and potentially forecast clinical outcomes.

3. RESEARCH METHODOLOGY

A retrospective analysis was conducted on 101 confirmed Dengue cases spanning various age groups, admitted to a tertiary care hospital. Comprehensive data encompassing demographic information, clinical symptoms, laboratory findings at admission, and outcomes at discharge were meticulously collated. Statistical analyses, focusing on symptom frequencies, haematological parameter distributions, and outcome correlations. were utilized to identify significant patterns and associations.

3.1 Study Design and Setting: *

An observational retrospective study was conducted at BJ Medical College (Civil Hospital Ahmedabad) to assess the clinical, biochemical, and hematological parameters of patients diagnosed with Dengue fever. The study spanned a period from August to October 2023, a typical post-monsoon duration when Dengue fever cases surge in this region.

3.2 Patient Selection:

A total of 101 patients' records who were admitted to the hospital with a serologically confirmed diagnosis of Dengue fever were examined. The inclusion criteria were strictly patients with a definitive diagnosis based on clinical features and positive Dengue serology. Those with co-existing infections or incomplete records were excluded to maintain the integrity of the data.

3.3 Data Collection:

Data were systematically retrieved from the college's office records section. Patient files provided detailed information on symptoms, the progression of the disease, and the treatment given. Recorded parameters included the duration of fever, presence of headache, vomiting, abdominal pain, haemorrhagic symptoms, and other clinical manifestations. Liver function tests, renal profile, complete blood counts, and haematocrit values were meticulously compiled.

**Ethical Considerations: **

Prior to the commencement of data collection, approval was obtained from the Institutional Ethics Committee of BJ Medical College. All patient records were anonymized before analysis to protect privacy rights.

3.4 Data Analysis:

3.4.1 Statistical analysis:

The recorded data was compiled and entered in a spreadsheet computer program (Microsoft excel 2013) and then exported to data editor page of SPSS version 15 (SPSS Inc., Chicago, Illinois, USA). For all tests, confidence level and level of significance were set at 95% and 5% respectively. Descriptive statistics were employed to analyse the data. The frequency and percentage distributions of categorical variables, along with means and medians for continuous variables, were computed.

3.4.2 Data Validation and Integrity:

To ensure the accuracy of the data analysis has been performed accurately, the research team conducted a thorough manual verification of all computational outputs against the original patient records. Any inconsistencies detected were resolved by revisiting the patient data for confirmation.

3.5 Study Limitations:

The retrospective nature of data collection, within a limited timeframe and from a single institution, may restrict the generalizability of the findings. The potential for selection bias and missing data is acknowledged as an inherent limitation of retrospective studies.

IV. RESULTS AND DISCUSSION

4.1 Results

In the period extending from August to October 2023, a retrospective analysis was carried out on 101 patients diagnosed with Dengue fever at BJ Medical College (Civil Hospital Ahmedabad). This study aimed to illuminate the clinical profile and laboratory parameters associated with Dengue fever cases in a tertiary care setting.

Clinical Features:

The age distribution of the patients revealed a broad range, with a peak incidence in the young adult group, as depicted in Figure 1. The clinical presentation was dominated by fever, reported in 96 patients, with the majority experiencing fever for a duration of 2 to 4 days. Other common symptoms included headache (25 patients), nausea/vomiting (23 patients), abdominal pain (24 patients), and bleeding (3 patients).

Biochemical Parameters:

Elevations in liver enzymes were a significant finding, with 44 patients exhibiting increased levels, indicating hepatic involvement. Additionally, creatinine levels were found to be elevated in 16 patients, pointing towards possible renal impairment as part of the disease spectrum.

Hematological Parameters:

Hematological analysis underscored the impact of Dengue fever on blood constituents. Hematocrit levels were elevated in 4 patients, consistent with hemoconcentration, a recognized complication in the course of Dengue hemorrhagic fever. The need for transfusion was identified in 16 patients, which underscores the potential severity of the disease. A marked decrease in platelet count was observed, with 56 patients recording platelet counts below 100,000 per cubic millimeter. Furthermore, leukopenia was evident in 47 patients, as WBC counts were less than 4,000 per cubic millimeter, which aligns with the expected viral infection profile .

Symptomatology Beyond Fever

Further symptom analysis revealed convulsions in 7 patients, joint pain in 4 patients, chest pain in 8 patients, and encephalitis in 3 patients. Cold symptoms were noted in 4 patients, and death was reported in 3 cases. Notably, gastrointestinal symptoms like black stools and diarrhoea were not reported, which typically suggest a lower prevalence of gastrointestinal complications in this cohort

Graphical Representation

The graphical representations of the study findings include histograms depicting age-wise distribution and fever duration (Figures 1 and 2)

*Figure 1: Age Distribution Histogram

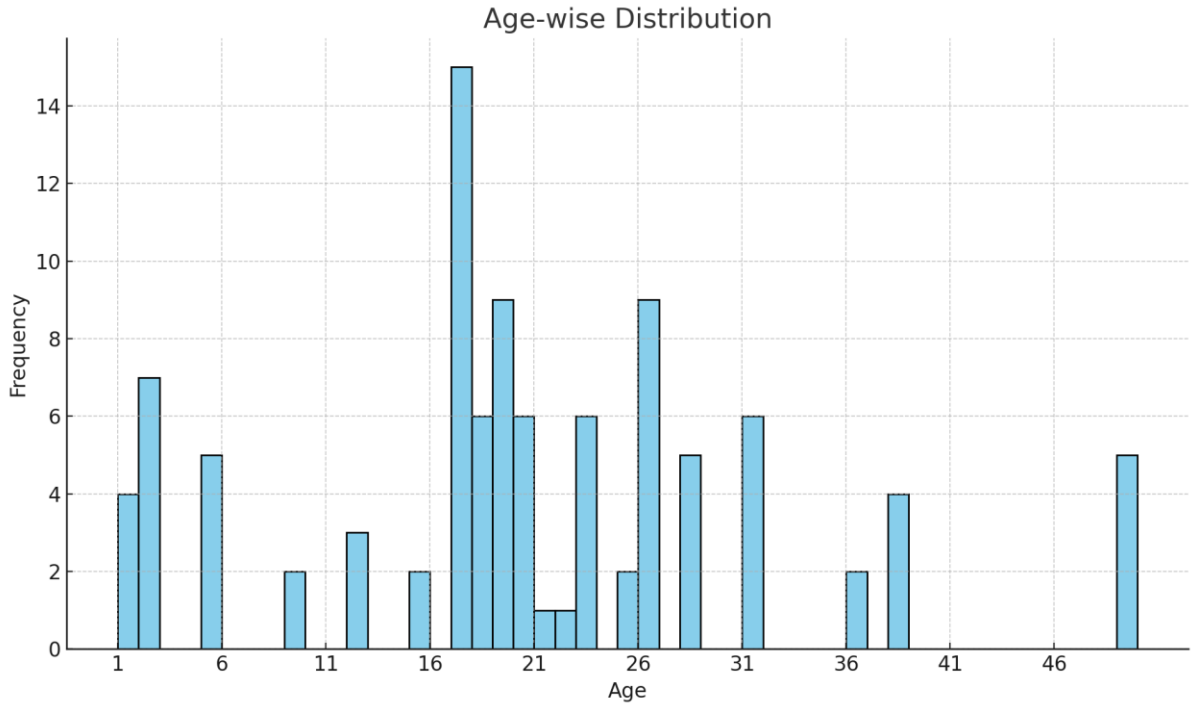
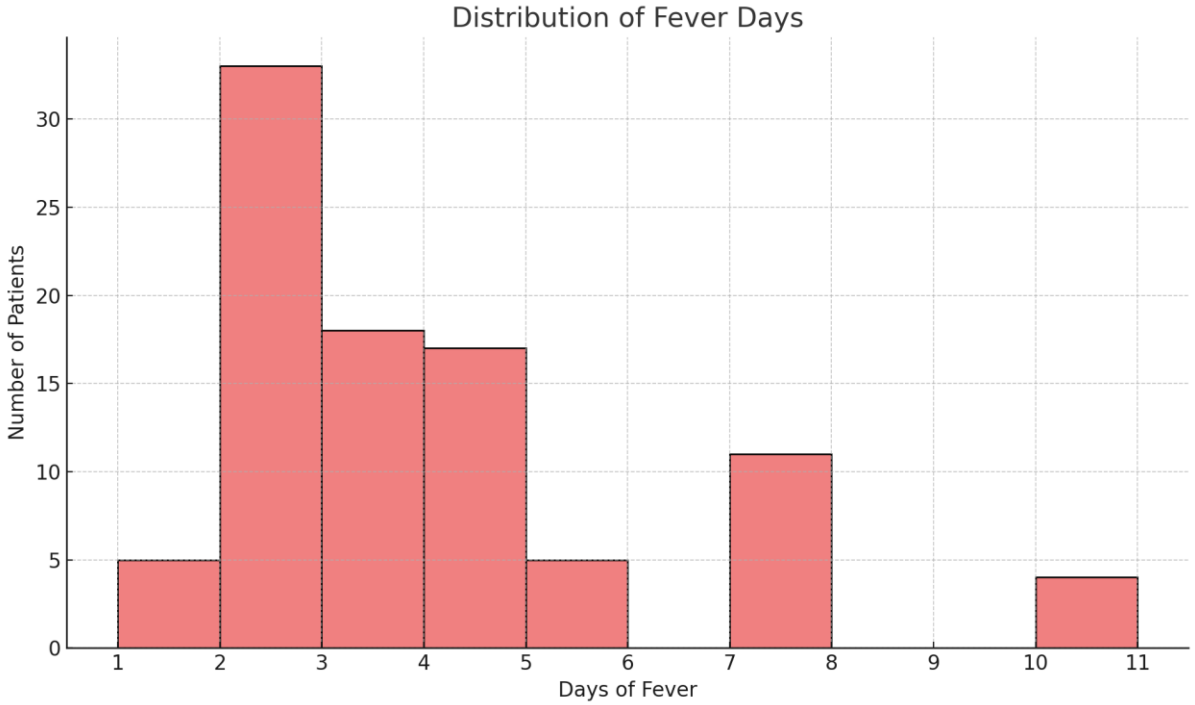


*Figure 2: Distribution of Fever Days



Discussion

This retrospective analysis investigated the clinical profile and laboratory parameters associated with Dengue fever in 101 patients admitted to BJ Medical College (Civil Hospital Ahmedabad) from August to October 2023. Our findings contribute to the understanding of Dengue fever presentation in a tertiary care setting within this region.

Clinical Presentation and Dengue Severity

Our study aligns with previous research highlighting fever as the predominant symptom in Dengue fever patients (WHO; Bhatt *et al*., 2013). The observed duration of fever (2-4 days) is also consistent with established literature (Guzman and Harris, 2015). While bleeding manifestations were infrequent (3 patients), this aligns with the non-haemorrhagic presentation observed in most cases. However, it is important to acknowledge that this does not exclude the possibility of some patients developing severe dengue later in the course of illness. Early identification of warning signs like abdominal pain, persistent vomiting, and mucosal bleeding is crucial for prompt management and preventing complications (Simmons *et al*., 2012).

Laboratory Findings and Dengue Complications

Elevations in liver enzymes, as seen in 44 patients, are a well-documented complication of Dengue infection, indicating hepatic dysfunction (Simmons *et al*., 2012; Trung *et al.* ,2010). Liver involvement associated with dengue infection in adults. The specific enzymes elevated (AST and ALT) and the degree of elevation can also provide prognostic information in some cases (Malavige, *et al.*,2004). Similarly, the observed elevation in creatinine levels (16 patients) suggests potential renal involvement, a complication requiring further investigation in larger studies (Lee, *et al.*, 2005). Here, examining factors like pre-existing kidney disease and hydration status would be valuable to understand the contribution of Dengue infection to elevated creatinine levels.

The haematological profile provided valuable insights. The low platelet count (<100,000/mm3) in 56 patients and the need for blood transfusion in 16 cases highlight potential complications associated with Dengue-induced thrombocytopenia (Wichmann, *et al*.,2004). Interestingly, the study did not report a high prevalence of leukocytosis, which can sometimes be present in secondary bacterial infections superimposed on Dengue (Halstead, 2008). Leukopenia, observed in 47 patients, is a characteristic feature of viral infections, including Dengue fever (Martina, *et al.*, 2009).

Atypical Presentations and Limitations

The low prevalence of gastrointestinal symptoms (cold, diarrhea, black stools) in this cohort deviates from some previous reports (Thomas, *et al*., 2008; Whitehorn and Simmons,2011). This could be due to the relatively smaller sample size or regional variations in disease presentation. Studies suggest that the specific Dengue serotype might influence the clinical presentation, and further investigation incorporating viral serotyping could be insightful (Gubler, 1998).

A limitation of this study is its retrospective nature, which relies on existing medical records and may be susceptible to data collection bias. Additionally, the generalizability of findings might be limited due to the single-center design and the specific timeframe of the study.

5. Future Directions

Future prospective studies with larger and geographically diverse patient populations could provide more robust insights into Dengue fever presentation and complications. Additionally, investigating factors influencing atypical presentations and incorporating viral serotyping would further enrich the understanding of Dengue fever in this region. Longitudinal studies tracking disease progression and outcomes would also be valuable for improving clinical management strategies.

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